

## References on Mexican Mammals: Origin and Impact

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Several works address the accumulated knowledge on Mexican mammals and document with a high degree of certainty the history and current status of mammalogy in Mexico. Given the amount of information gathered to date, our interest focused on quantifying and analyzing the literature references that support such knowledge. We used the literature that we have gathered over more than 40 years. This was analyzed by building a database that includes all the references related to any aspect of the study of the Mexican mammals. This comprised the period between 1648 to the end of 2016. Of the 6,732 references reviewed, 5,467 (81 %) were published in 702 journals from 45 countries. Eighty seven percent of the journals are from only 11 countries, and the remaining 13 % comes from other 34 countries. Articles are concentrated in a few magazines; 61.5 % were published in just 27 journals, and the remaining 38.5 % are scattered in 675. The Impact Factor (IF) of journals publishing on Mexican mammals is higher than the average for other branches of Zoology, although most works are published in journals with an IF below 0.5. We reviewed the origin, evolution and extinction of the most important journals; in addition, the relevant personalities in the study of Mexican mammalogy are highlighted. The number of articles and journals increase with time, but the trend was not constant. World Wars I and II are factors that negatively impacted academic production; on the contrary, post-war periods of strong economic and academic growth led to methodological, conceptual and technological advances that fostered growth. Journals are published under the auspices of scientific societies, universities, museums of natural history, research centers, and a small number are private; among them all, scientific societies have contributed overwhelmingly to the knowledge of the mammals of Mexico. Mexican mammalogy is a discipline undergoing a rapid expansion, with a higher number of works being published, a widening scope, and knowledge is disseminated through a greater variety of journals, most of them well established and of broad circulation. However, the current conditions of our institutions where mammal research is undertaken, the lack of opportunities to incorporate young researchers, and the limited financial and material resources, prevent to foresee a promising future.

Diversos trabajos se ocupan del conocimiento acumulado de los mamíferos de México que documentan con alto grado de certidumbre la historia y el estado actual que guarda la mastozoología mexicana. Por el cúmulo de información almacenada, nuestro interés se centró en cuantificar y analizar las referencias bibliográficas que avalan dicho conocimiento. Utilizamos la bibliografía que hemos reunido a lo largo de más de 40 años. Para su análisis se construyó una base de datos con todas las referencias que tuvieran relación con cualquier aspecto del estudio de los mamíferos de México. Se consideró el período comprendido de 1648 hasta finales de 2016. De las 6,732 referencias revisadas, 5,467 (81 %) se publicaron en 702 revistas de 45 países. El 87 % de las revistas proceden solamente de 11 países, mientras que el 13 % restante procede de otros 34 países. Los artículos se concentran en pocas revistas, de esta manera el 61.5 % se publicó sólo en 27 revistas, mientras que el 38.5 % restante se dispersan en 675. El Factor de Impacto (FI) de las revistas en donde se publica sobre mamíferos de México es mayor que el promedio de otras ramas de la zoología, aunque la mayor parte de los trabajos lo hacen en revistas con FI inferior al 0.5. Revisamos el origen, la trayectoria y la extinción de las revistas más importantes y se mencionan las personalidades relevantes en el estudio de la mastozoología mexicana. El número de artículos y de revistas aumentan con el tiempo, pero el cambio no fue constante. Las guerras mundiales I y II son factores que impactan de manera negativa la producción académica; por el contrario, las épocas de posguerra con fuerte crecimiento económico y académico propician cambios metodológicos, conceptuales y tecnológicos que favorecen el crecimiento. Las revistas se editan bajo los auspicios de sociedades científicas, universidades, museos de historia natural, centros de investigación y las menos son particulares, pero son las sociedades científicas las que han participado de manera abrumadora en el conocimiento de los mamíferos de México. La mastozoología mexicana es una disciplina en vertiginoso crecimiento, se publican más trabajos, se diversifican los campos de interés, el conocimiento se difunde en mayor variedad de revistas, la mayoría bien acreditadas y de amplia circulación; sin embargo, dadas las condiciones por las que atraviesan nuestras instituciones en donde se desarrolla la disciplina, la ausencia de oportunidades para incorporar jóvenes investigadores, recursos financieros y materiales limitados, impiden atisbar un horizonte promisorio.

**Key words:** Bibliography; history; journals; mammals; Mexico.

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### Introduction

From the last third of the 20th century, local researchers worked to gather information, study the history and analyze the extent of the knowledge about the mammals of Mexico. These contributions include some that deal with this subject in general terms ([Ramírez-Pulido and Brit-](#)

[ton 1981](#); [Ramírez-Pulido and Mudespacher 1987](#); [Leon-Paniagua 1989](#); [Villa-Ramírez and Cervantes 2003](#); [Arroyo-Cabral et al. 2005, 2014](#); [Ríos-Muñoz et al. 2014](#); [Sánchez-Cordero et al. 2014](#)), others addressed the subject from the point of view of scientific collections ([Espinoza et al. 2006](#); [Ramírez-Pulido and González-Ruiz 2006](#); [Retana 2006](#)), lit-

erature reviews ([Guevara-Chumacero et al. 2001](#)), by geographical regions ([Ramírez-Pulido et al. 2016](#); [Zaragoza-Quintana et al. 2016](#)) or focusing on particular taxonomic groups such as squirrels ([Ramos-Lara and Koprowski 2014](#)) and carnivores ([Perez-Irinea and Santos-Moreno 2011, 2013](#)), also from the standpoint of descriptions of new taxa ([Ramírez-Pulido and Britton 1981](#)) or from the history of the Mexican Association of Mammalogy ([Briones-Salas et al. 2014](#); [Lorenzo and Hernandez-Betancourt 2014a](#)), as well as from the influence and participation of foreign researchers ([Lopez-Medellin and Medellin 2016](#)).

These contributions delineate with a high degree of certainty the history and current status of Mexican mammalogy; nonetheless, many gaps in the knowledge of this zoological group still remain, leaving many areas of opportunity to address the missing information. However, the increase in the number of researchers and research institutions result in a significant volume of scientific publications encompassing a broad range of research fields and specialties. Consequently, the analysis of the information available is a task that surpasses the individual capacity and demands teamwork, not always easy to achieve.

Despite the wealth of information, a task still pending is the quantification of the references that support the knowledge about mammals. To this end, we used the bibliography on Mexican mammals gathered during more than 40 years for two major objectives: document the geographical distribution at the state level, and complete the synonymy of the mammals of Mexico, for which the corresponding information in its simplest form is concentrated in seven books ([Ramírez-Pulido et al. 1982; 1983; 1986; 2000](#); in press; [Ramírez-Pulido and Castro-Campillo 1990; 1994](#)), as well as the information produced in the last few years and not yet published. The review of this accumulated information have led to the publication of several papers (e. g. [Ramírez-Pulido et al. 2014; 2016](#)); however, we have not analyzed the production rate through time, the source of articles, journals and books, nor the issues related to some of the references.

The analysis of the publications of [Guevara-Chumacero et al. \(2001\)](#) reveals, among other things, that the study subjects have become diversified and the number of works has increased. These conclusions were based on the analysis of 2,129 literature references that yielded a more comprehensive and in-depth approximation, and contribute a better understanding about the history of the mammals of Mexico. The aim of this work is to assess the information derived from the review of 6,732 literature references, to contribute to the understanding of the development and broaden the knowledge of the mammals of Mexico, from the historical and prospective points of view.

## Materials and Methods

A database was built with all the literature references related to the mammals of Mexico. Initially, only works dealing with taxonomy and systematics were considered, when these

documented the examination of specimens from Mexican sites, irrespective of the group studied. We soon realized that this approach was rather narrow and decided to add those publications that, without reporting the examination of specimens, referred to taxa whose geographical distribution reaches Mexico and its inclusion was mandatory for a better knowledge of the group. However, this lead to a significant increase in the volume of information; with time, a greater amount of publications were added regardless of the language, topic, author and source of the publication, provided the study focused on taxa with geographical distribution in Mexico. This database lists the author, year of publication, title, journal or editorial, volume number, pages, exact date of publication, classification according to book, chapter or journal; although there are publications that, strictly speaking, do not match any group, these have been entered nonetheless as journals for being serial publications. In the case of studies published in journals, the country of origin and the topics addressed were also entered. This literature database includes only journals, books and book chapters; thesis, congress proceedings and technical reports were excluded.

Despite the fact that this work is based on the review of the publications related to Mexican mammals dated from 1648 to 2016, although the 2016 references are not yet complete in spite of the effort to keep the database up to date, there is information beyond our reach for various reasons: the diversification and multiplication of sources of information, especially as regards the number of journals, the topics addressed, and the number of works published per year. We occasionally learn of works published addressing topics related to mammalogy a couple of years after publication.

In some books and serial publications, the year of publication differs from the year of the series; to avoid confusion, we used the date of print, which is also the date of dissemination. This same principle was followed for articles, book chapters, and even journals with outdated publication or articles published after the corresponding number. For managing the information, our analysis covers all published works assuming that they all have the same value, regardless of the topic addressed or its size in number of pages.

## Results

A total of 7,727 publications were reviewed, including journals, books and book chapters. Of these, 995 were excluded; although important for the taxonomic history of some species, these only deal with the synonymy of the Mexican mammals ([Ramírez-Pulido et al. in litt.](#)). Accordingly, the number of publications included in this analysis was reduced to 6,732, the oldest being those of [Marcgraf de Liebstad \(1648\)](#) and [Hernandez \(1651\)](#). The first mentions *Sylvilagus brasiliensis* and *Eira barbara*; the second is the first formal register of Mexican mammals after the graphical representation in pre-Hispanic codices. From these publications and until 1755, one work was published every 20 years, so this information was not included in our analysis.

In the 19th century, the academic production was modest and showed slight variations. Nonetheless, in the late 19th century and early 20th century two institutions played a key role in the knowledge of the mammals of Mexico: the British Museum of Natural History, which led to the publication of the *Encyclopedia of Natural History of Mexico and Central America (Biologia Centrali-Americana)*, printed in 5 volumes between 1879 and 1888; and the *U.S. Bureau of Biological Survey*. It is from the involvement of European and North-American naturalists that the production increased significantly, although two events considerably slowed down the production at that time, the Mexican Revolution and the World War I. In the decade of 1930 an upturn was observed, which did not reach the levels observed at the end of 1900 (Figure 1). Again, the World War II had an impact in a variety of socioeconomic aspects at the global level, and mammalogy was no exception, which resulted in another significant decline in the number of published works (Figure 1).

After World War II the world experienced a complex situation for political and ideological reasons, plagued with key events, but nonetheless their effects reached mammalogical production. This epoch witnessed a trend towards a rise in the number of works, with no significant changes, and it is until the decade of 1990 that a noticeable increase was observed, which continued until the end of 2016.

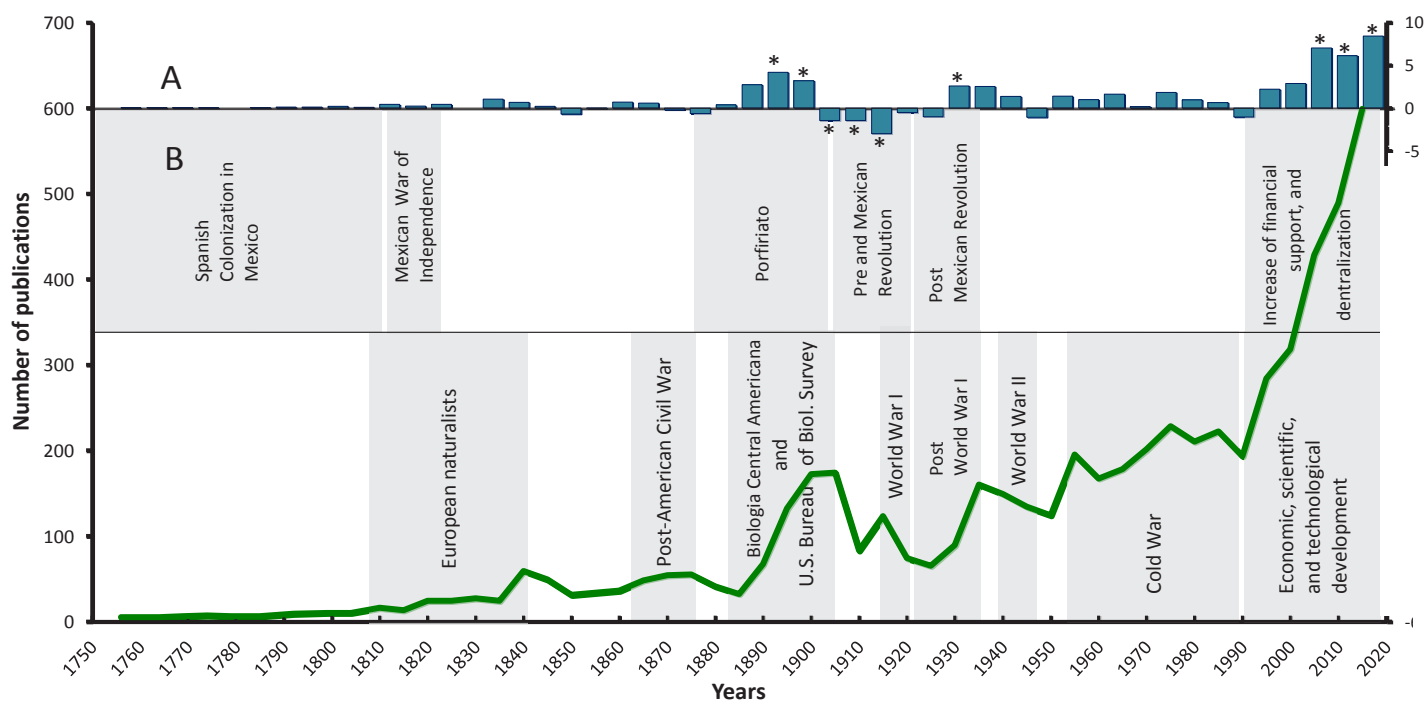
In spite of the historical fluctuations in the production of works, the 6,732 references contributing to the knowledge of the terrestrial mammals of Mexico have accumulated over a little more than 360 years; of these, 81.2 % ( $n = 5,467$ ) were published in 702 journals from 45 countries. Of the rest, 9.1 % ( $n = 610$ ) are book chapters, and 9.7 % ( $n = 655$ ) specialized books. All references were physically reviewed

at least once. Exceptions are seven old publications from the 18th and 19th centuries that could not be located and, hence, were excluded from this study (Appendix I).

**Source and situation of journals.** Of the 702 journals, 86.3 % ( $n = 606$ ) are published in the United States of America, Mexico, Germany, United Kingdom, France, Brazil, Italy, Russia, Canada, Argentina and The Netherlands; other 34 countries represent a mere 13.7 % ( $n = 96$ ), with a number of journals that range between 1 and 8 per country (Table 1). In particular, 41.5 % comes from the United States of America ( $n = 291$ ), 12.8 % ( $n = 90$ ) from Mexico, followed by Germany ( $n = 56$ ; 8.0 %), United Kingdom ( $n = 51$ ; 7.3 %), France ( $n = 38$ ; 5.4 %), Brazil ( $n = 19$ ; 2.7%), and Italy, Russia, Canada, Argentina and The Netherlands ( $n = 64$ ; 9.1 %).

The U.S. journals have published the largest number of articles on Mexican mammals (61.5 %,  $n = 3,360$ ), with 60 % concentrated in nine journals and the remaining 40 % in 282. The papers published in Mexican journals ( $n = 1,012$ ) are found in 90 journals, but the majority is concentrated in just a few, with 81 % of articles published in only eight Mexican journals. In general, the results reveal that a few magazines concentrate most of the works of interest for our objectives; accordingly, 61.5 % ( $n = 3,363$ ) of the references were published in 27 journals, while the remaining 38.5% ( $n = 2,104$ ), in 675 (Figure 2).

The 27 most important journals in terms of the number of articles published come from the United States of America, Mexico, Germany, United Kingdom and France, averaging 127.5 articles per journal during the study period, with a minimum of 34 articles in *Mammalia* (France) and a maximum of 644 in the *Journal of Mammalogy* (USA). The most important US journals are the *Journal of Mammalogy*, *Pro-*



**Figure 1.** Publications related to the mammals of Mexico from 1756 until the end of 2016. a) Difference of published works, bars above and below the line indicate increase or decrease of the number of works; asterisks indicate extreme values that differ from the average by more than one standard deviation. b) Number of published works and their relationship with the political and social events that influence the academic production (top: historic events in Mexico; down: in the World).

**Table 1.**— Number of journals by country of origin that have published works on the mammals of Mexico.

Country	No. Journals	Country	No. Journals
United States	291	Costa Rica	3
Mexico	90	Cuba	3
Germany	56	Poland	3
England	51	Barbados	2
France	38	British Guyana	2
Brazil	19	Peru	2
Italy	14	China	2
Canada	13	Bulgaria	1
Argentina	12	Croatia	1
Russia	13	Curazao	1
Netherlands	12	Ecuador	1
Spain	6	Slovakia	1
Colombia	7	Finland	1
Switzerland	7	Libya	1
Denmark	6	New Zealand	1
Belgium	5	Pakistan	1
Japan	5	Paraguay	1
Venezuela	5	Puerto Rico	1
Australia	5	Serbia	1
Hungary	4	Taiwan	1
India	4	Trinidad	1
Sweden	4	Uruguay	1
Chile	3		

*ceedings of the Biological Society of Washington, Mammalian Species, The Southwestern Naturalist, Bulletin of the American Museum of Natural History, American Museum Novitates, University of Kansas Publications Museum of Natural History, Proceedings of the Academy of Natural Sciences of Philadelphia, Occasional Papers The Museum of Texas Tech University, Proceedings of the United States National Museum and North American Fauna* (Figure 3); taken together, these 11 journals concentrate 2,123 (64.3%) references.

Among the Mexican journals, those worth highlighting include *Anales del Instituto de Biología* of the National Autonomous University of Mexico, founded in 1930 and transformed into *Anales del Instituto de Biología, Serie Zoología* from 1967 to 2004, to become *Revista Mexicana de Biodiversidad* in 2005, a journal that has published 265 works. *Acta Zoologica Mexicana*, created in 1955, accumulates 175 studies; *Revista Mexicana de Mastozoología*, whose volume one number one was launched in 1995, includes 119 works; and *Therya*, the most recent journal of those reviewed, launched its volume one in 2010 and has published 121 papers. Other journals, although involving a smaller number of articles, are nonetheless important for the historical role they have played, such as *La Naturaleza*, *Revista de la Sociedad Mexicana de Historia Natural*, *Anales de la Escuela Nacional de Ciencias Biológicas*, *Vertebrata Mexicana* and *Ciencia México* (Figure 3), which jointly contributed with 847 works.

Many journals are either short-lived or do not publish on Mexican mammals over long periods of time. The mean active publication period is only 3.7 years; only 54 of them (7.5 %) have lasted more than 10 years and, of these, just nine lasted more than 50 years. The 27 important journals for the number of accumulated works (Figure 3) also include the most long-lasting ones, with an average duration of 84 years for US journals, such as *Proceedings of the Biological Society of Washington*, *Bulletin of the American Museum of Natural History*, and *Proceedings of the Academy of Natural Sciences of Philadelphia*, which have been active for over 130 years and are still being published. Exceptions are the *University of Kansas Publications Museum of Natural History*, which has adopted a new name, and *Proceedings of the United States National Museum*, which is no longer printed.

The most important Mexican journals (Figure 3) have been active for an average of 44 years, although not continuously in all cases. One of them is no longer circulating (*La Naturaleza*), others were short-lived (*Vertebrata Mexicana*), and yet others are published intermittently (*Revista de la Sociedad Mexicana de Historia Natural* and *Anales de la Escuela Nacional de Ciencias Biológicas*).

The number of journals is on the rise, from a single one in 1683 up to 149 in 2016. However, this trend has not been constant through time: in the 19th century, the increase rate was two journals per year; in the 20th century, 9.4; and in the 21st century, 14.6 (Figure 4). The number of papers in each journal also increased with time, from one in 1683 to four works per journal in 2016; however, this number peaked in 1900 to 1910 with 5.4 works per journal per year, even surpassing the current rate.

The importance of the impact factor (IF) in our field, associated with the academic and personal economic reward, is evident when the production over the past 25 years is reviewed, a period when 2,144 works were published in 338 different journals; more than half of these (62 %,  $n = 1,334$ ) appeared in indexed journals with an IF ranging from 13.2 to 0.101. Another relevant data for this period is that 75 % ( $n = 1,608$ ) of all works were carried out by Mexican colleagues, and 52 % of these ( $n = 828$ ) were published in indexed journals.

In a first approximation, the average IF for Mexican mammalogy is high, 1.47. However, this value does not strictly represent the reality of this field, since a more detailed analysis reveals that of the 828 published, only 143 (13 %) appear in journals with an IF above 2.0, while 685 (87 %) are included in journals an IF varying from 1.9 to 0.101 and, within this range, the majority ( $n = 631$ ) were published in journals whose FI is less than 0.590.

## Discussion

**History of production.** The knowledge on the mammals of Mexico has been built throughout a little more than 360 years. It started formally with the book of [Marcgraf de Liebstad \(1648\)](#) that mentions the name *Eira ilya*, used by [Ham-](#)

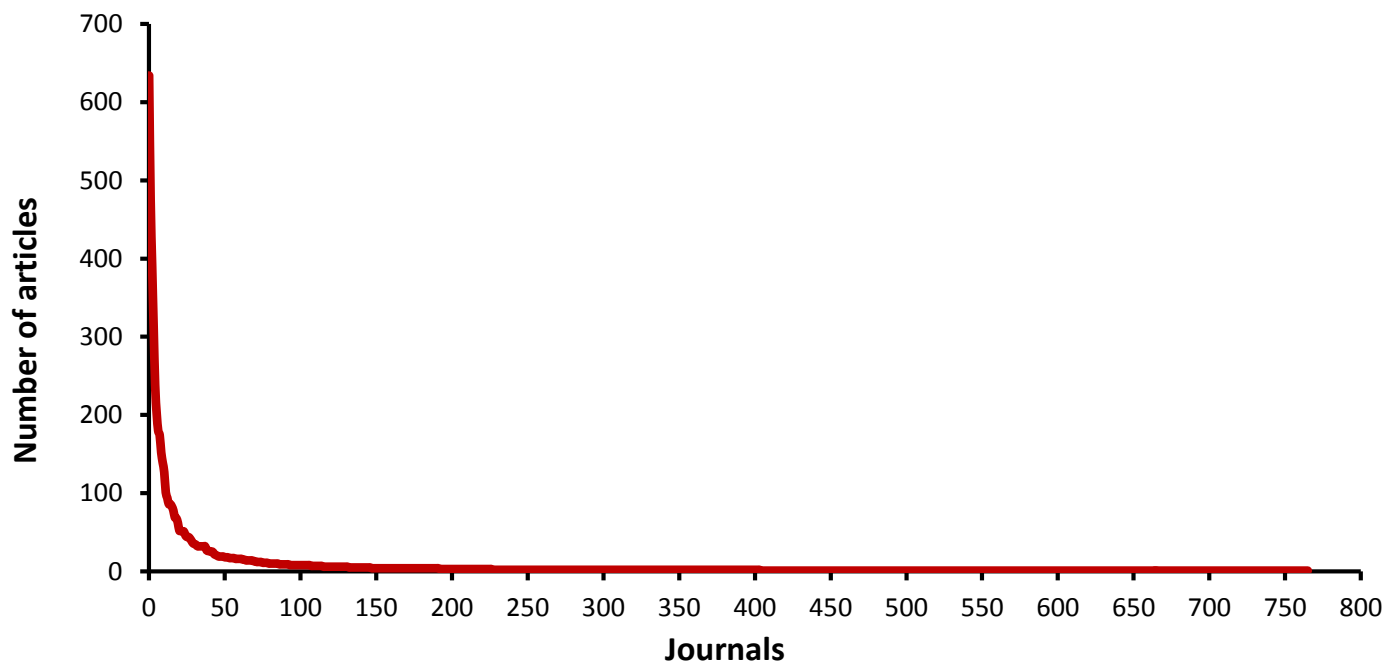


Figure 2. Trend in the number of articles per journals that were published on the mammals of Mexico from 1648 to 2016.

ilton-Smith (1842) to replace [*Mustela*] *barbara*, currently known as *Eira barbara* (Linnaeus, 1758). However, the work by Hernandez (1651) could be considered as the beginning of the study of mammals of Mexico, because it contains the first list of Mexican mammals. On the other hand, the first record of a specimen from Mexico was mentioned by reporting the name *Canis nigrirostris* (= *Urocyon cinereoargenteus nigrirostris*) from Real de Arriba (= Temascaltepec, Estado de México), and 1850 is frequently mentioned as the date of description (Hall and Kelson 1959:861), when in reality the article was read in the Academy in 1827 and published in 1830.

In this way, from 1648 until the end of 2016 a total of 6,732 references have accumulated, surpassing those on ornithology, which totalled 5,500 studies as of 2008 (Navarro-Siguena et al. 2008), making mammalogy the discipline most studied in Mexico, at least within the field of vertebrate zoology. Until the end of 2016 we recorded 367 years of publications, where the dedication of many researchers and their contributions, especially from the first third of the 19th century, allows to gain a first insight, not comprehensive yet, about the Mexican mammalogy. This overview has been summarized in previous works (Ramírez-Pulido and Britton 1981; Ramírez-Pulido and Mudespacher 1987; Leon-Paniagua 1989; Guevara-Chumacero et al. 2001; Arroyo-Cabrales et al. 2005; Ramírez-Pulido and González-Ruiz 2006). However, the production is far from being constant, let alone homogeneous in numerical terms; on the contrary, it fluctuates through time, dramatically at times (Figure 1). As a general trend, since the 17th century the number of works rose steadily until the late 19th century and early 20th century, to show a vertiginous boost in the last third of the 20th century, particularly from 1990 on.

The most important events that affected the produc-

tion rate of these contributions are closely related to social, political and economic events that influence the development of mammalogy in Mexico. Wars are apparently one of the key drivers that negatively affected academic production, a situation confirmed by the finding that the production rate decreased during wars and increased again when these ended (Figure 1). Particularly during the Mexican Revolution and the World Wars I and II, the production of scientific work (Bernal 1960; Guevara-Chumacero et al. 2001), the description of new taxa (Ramírez-Pulido and Britton 1981; Ramírez-Pulido and Mudespacher 1987), and the development of scientific collections (Ramírez-Pulido and González-Ruiz 2006) slowed down. It is understandable that during the war the expeditions were suspended, the economic resources were reallocated to other priorities or persons changed their activity, albeit on a temporary basis. A clear example is shown by US researchers that participated in these wars and postponed their academic activity; examples are Harold E. Anthony, Remington Kellogg and Edward A. Goldman, who served during World War I (Sterling 1991; Layne and Hoffmann 1994), while Emmet T. Hooper, James S. Findley and Rollin H. Baker, who were recruited in World War II (Layne and Hoffmann 1994; Phillips et al. 2009), just to mention a few researchers with an important participation in the study of the mammals of Mexico. After World War II, J. Knox Jones, Jr. and Elmer C. Birney were in active service in various parts of the world (Findley et al. 1996; Genoways et al. 2000). In addition, the only time that the American Association of Mammalogy has cancelled its congresses was during World War II in 1943 and 1944 (Gill and Wozencraft 1994), although the journal of this association (*Journal of Mammalogy*) did not cease publication (Verts and Birney 1994). In the particular case of Mexico, after the Mexican Revolution the state policy supported basic education,

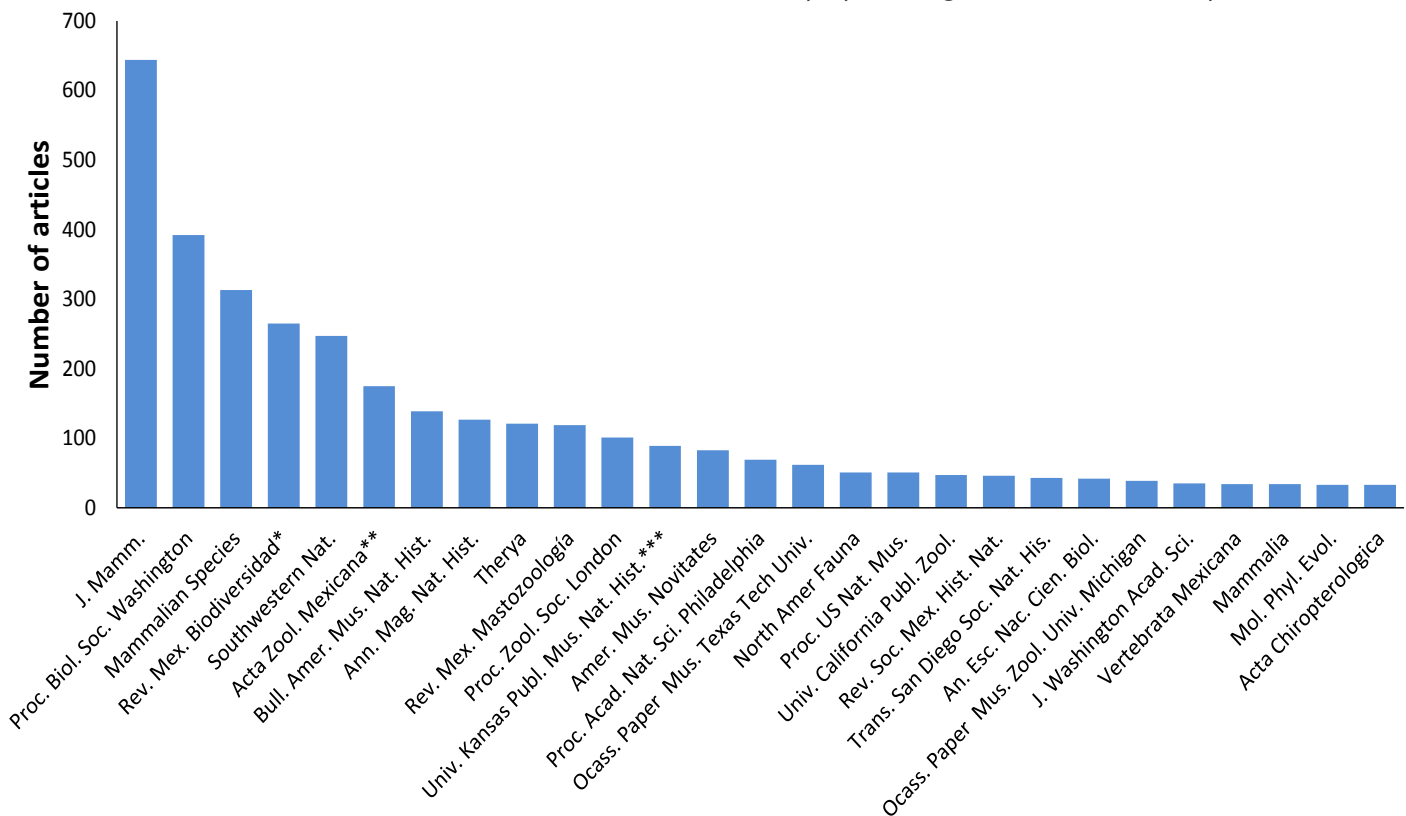
which explains the lack of support to higher education and science for decades (Perez-Tamayo 2005). The collapse of the production during these three wars was so great that it recovered until the decade of the 1960: before the Mexican Revolution, in early 1900, an average of 37 works were published per year, with a maximum of 52, a figure that was reached again until the late 1960s when an average of 42 works were published per year.

We used the Cold War period to name a period of history in our analysis (1950 to 1989), characterized by a relatively constant production rate (Figure 1). The effects of Cold War on academic production are not unknown, but also true is that during this period, even when the growth was slow, it did exceed the production of the previous years; it contributed with 18.8 % of the total number of publications over the 39 years it lasted. Important investigations were conducted during this period, including most monographs state and many taxonomic revisions. Also, important researchers participated at the time, known for the top quality of their works on Mexican mammals, including George G. Goodwin, Emmet T. Hooper, Rollin H. Baker, Walter W. Dalquest, William B. Davis, E. Raymond Hall, Philip Hershkovitz, Robert S. Hoffmann, J. Konx Jones Jr., Sidney Anderson and Charles O. Handley Jr., just to mention some of the most productive personalities of the time, all of them from the U.S. In Mexico, some mastozoologists that were similarly important for their productivity were Bernardo Villa Ramírez and Ticul Alvarez, the helminthologist Edu-

ardo Caballero y Caballero, and the entomologist Alfredo Barrera Marin.

From the historical point of view, there are periods characterized by a substantial increase in the knowledge of the mammals of Mexico. The first occurred between 1835 and 1840 (Figure 1), and is important for the shift in the approach to observe nature after the publication of the *Sytema Naturae*, Lamarck's revolutionary ideas, the discussions of Georges Cuvier and Geoffroy Saint-Hilaire (Hoffmeister and Sterling 1994), the ideological changes and the growing interest in natural sciences worldwide (de Gortari 1963; Guevara-Fefer 2002). Before and during that period, the European governments sent trade or exploration vessels that included a naturalist as a crew member, with Darwin and the Beagle being the best example (Baker 1991; Hoffmeister and Sterling 1994). A number of publications resulted from these exploration trips, including those by the French Alcide d'Orbigny, François Louis Paul Gervais, Isidore and Étienne Geoffroy St-Hilaire; the Swiss Henri de Saussure; the English George Robert Waterhouse; and the German Heinrich Gottlieb Ludwig Reichenbach and Eberhard August Wilhelm von Zimmermann.

In the U.S., the Civil War was followed by a period of rapid expansion of scientific development that involved government agencies and educational institutions, including the creation of scientific societies (Kevles et al. 1980). There were two points of peak production, the first led mainly by the English John Edward Gray and the German



**Figure 3.** The 27 most important journals that have published works related to the mammals of Mexico, which altogether account for 61.5 % (n = 3,363) of the articles published in journals. The following journals are included: \* Anales del Instituto de Biología, Anales de Instituto de Biología, Serie Zoología y Revista Mexicana de Biodiversidad; \*\* Acta Zoológica Mexicana y Acta Zoológica Mexicana (nueva serie); \*\*\* Occasional Papers of the Museum of Natural History, University of Kansas y University of Kansas Publications, Museum of Natural History.

Wilhelm Peters, who jointly published more than 50 % of the works of the time (1865-1875; Figure 1). Meanwhile in Mexico, scientific interest grew with the creation of the Mexican Society of Natural History in 1868, and subsequently of the Geographical Exploratory Commission (Guevara-Fefer 2002; Ramírez-Pulido and González-Ruiz 2006; Navarro-Sigüenza et al. 2008), it was then that the French naturalist Alfredo Dugès performed the first work on mammalogy published in the first issue of the journal *La Naturaleza* (Dugès 1869). Years later, in a period of U.S. Intellectual effervescence (1885-1905; Figure 1), students were trained in modern biology (Hoffmeister and Sterling 1994) and the U.S. government created the Department of Agriculture in 1862, followed by the *Division of Economic Ornithology and Mammalogy*, which would become the *U. S. Biological Survey* in 1905, having its most productive phase during 1890 and 1910 (Schmidly and Tydeman 2016). This and other U.S. institutions conducted many expeditions to Mexico (Ramírez-Pulido and González-Ruiz 2006) and contributed a large number of Mexican mammal specimens to U.S. collections (Lopez-Wilchis 2006; Ramírez-Pulido and González-Ruiz 2006), which largely served from 1885 to 1905 for primarily taxonomic studies. This was the time when the highest number of publications per year was observed (Figure 4). The journals worth mentioning for the number of works published at that time are: *Proceedings of the Biological Society of Washington*, *Bulletin of the American Museum of Natural History*, *Proceedings of the Academy of Natural Sciences of Philadelphia*, *Proceedings of the United States National Museum*, *North American Fauna*, *The American Naturalist*, *Field Columbian Museum Zoological Series*. The researcher with the greatest production in this period was Clinton Hart Merriam, which in addition described the highest number of taxa (Ramírez-Pulido and Britton 1981) and was the architect of journals such as the *Journal of Mammalogy* and *North American Fauna* (Hoffmeister and Sterling 1994; Gardner 2016) that are still published to date. Other prominent researchers for their productivity at that time are Joel Asaph Allen, Outram Bangs, Gerrit Smith Miller, Edgar Alexander Mearns, Daniel Giraud Elliot, Samuel Nicholson Rhoads. For its part, the European that published a significant number of works is Oldfield Thomas with 107 works in just two journals, *Annals and Magazine of Natural History* (90) and the *Proceedings of the Zoological Society of London* (17).

Together, Clinton Hart Merriam, Joel Asaph Allen and Oldfield Thomas published 40 % of the works of this period, most of their publications being descriptions of species based on specimens collected from multiple expeditions to Mexico. Merriam's publications come from specimens collected by the *U.S. Biological Survey*, while Allen's are based on collections by J. H. Batty, A. C. Buller, A. W. Anthony and F. M. Chapman; Oldfield Thomas's were based on specimens collected in expeditions all over the world funded by him and his wife, especially to America (Hill 1990).

The latest and most conspicuous change took place at the beginning of the 1990s, when an exponential increase

in the number of publications was observed. To appreciate this change, in the 1980s an average of 47.4 works were published per year, lower than in previous decades, but from the 1990s this number increased to 70.3 to reach the maximum of 139 in 2014. To give an idea, in the past 25 years a total of 2,722 works were published, accounting for more than 40 % of the number published in the past 342 years ( $n = 4,010$ ). This unprecedented growth is the result of social, economic and technological changes at a global scale at the end of the Cold War with the fall of the Berlin Wall in 1989, an event that we take as a reference rather than as a consequence. This is a transition period characterized by global economic prosperity, paralleled by significant scientific and technological advances.

In this period, universities and research centers grow and evolve; the number of researchers increases; the funding for research, although austere, is remarkable (Ramírez-Pulido and González-Ruiz 2006), partly due to the interest in the conservation of the natural resources that propelled not only to mammalogy, but other branches of biology as well (Navarro-Sigüenza et al. 2008). The *Sistema Nacional de Investigadores* (National System of Researchers, SNI) was created in 1984, supplying economic funds for researchers according to the category and level granted by this organization; for their part, universities and research centers approved grants and incentives for their researchers based on productivity. The SNI was key not only for stimulating researchers, but also involved a shift in the state policy to invigorate scientific research institutions (Perez-Tamayo 2005; Peterson et al. 2016). The *Comisión Nacional para el Conocimiento y Uso de la Biodiversidad* (National Commission for the Knowledge and Use of Biodiversity, CONABIO) was born in 1992 and Zoology received strong economic support for specific projects; in addition, catalogs and biological collections became modernized technologically, among many other supports.

The above conditions were supplemented with the scientific and technological development that allowed for a better communication and data analysis. The production and purchase of personal computers boosted, with the global expansion of environmentally friendly platforms such as Windows and Word, the massive use of the Internet and e-mail. Although many of these technologies were already known since the 1980s, it is in the 1990s when their use became extensive; in fact, Birney and Choate (1994) mention their amazement about the "electronic age" when they wrote their book with a word processor and they exchanged messages from Kansas to Minnesota, which arrived in seconds. After the 1990s there was a technological development on a larger scale. These advances facilitated office, laboratory and fieldwork, for example, with the new programs available for personal computers, ranging from statistics, Geographic Information Systems, to those that assist in solving complex phylogenies. In the laboratory, these advances involve new equipment ranging from digital calipers to complex DNA sequencing equipment;

in the field, multiple remote sensing devices and camera traps, just to mention a few of the technologies that contribute to a faster, more efficient and more diverse work.

It is worth noting that any historical account of this type is necessarily incomplete, because in a global and historical context the contributing factors are varied and complex, and detailed explanations make it difficult to predict the likely progression. However, an exponential growth is observed until 2016 with no apparent asymptote that reduces scientific production (Figure 4). However production may stabilize in the next few years, precisely for the same reasons that led to their increase from the 1990s. While technological development will continue in vertiginous growth, the places for new researchers are increasingly limited; in fact, most universities and research centers increase its human resources only marginally and, in many cases, the academic staff is aging and, consequently, production is likely to slow down and, in the best of cases, will yield production rates similar to the current levels. On the other hand, post-graduate students that largely stimulate the interest to publish will be restrained by the local economic conditions and by the lecturing activities that researchers also undertake. The history of the studies on the mammals of Mexico reveals that the sources of employment and financing are factors that promote growth ([Ramírez-Pulido and González-Ruiz 2006](#)), but in our view, when these components are eliminated, without aiming to raise an apocalyptic vision, the development that has taken place up to date will likely slow down.

*Dissemination of knowledge.* The small works involving just a few pages are usually published in journals, being the ones that stand out for their quantity and, at the same time, supporting a large part of the knowledge of the Mexican mammals. Articles are produced with increasing frequency from a number of factors, including personal convenience and interest, tradition, speed of transmission of knowledge; for being short as opposed to books, articles require relatively less work and time to get published. Although the dissemination of results by means of articles in journals is common practice since the middle of the 17th century ([Kronick 1962](#), [Shank 1962](#)) and has played a key role in the communication of science ([Moskovkin and Serkina 2016](#)), this was not always the case. At that time, short communications were not fully accepted by the majority of academics; as a result, the author compiled his/her scattered contributions and edited them in book format, a common practice within societies and academies ([Kronick 1962](#), [Shank 1962](#)), which ultimately led to the genesis of journals. The oldest work we spotted in a journal was published in 1683 in *Philosophical Magazine*, which is one of the oldest in the world; it mentions the case of a peccary of Mexico, and we assume this refers to *Dicotyles tajacu* ([Tyson 1683](#)). In the 18th and 19th centuries no clear distinction existed between journal, book chapter and book; sometimes books were edited a separate chapters, so in many cases the date of publication is difficult or impossible to assign, as in the case of [Cuvier \(1820; 1823\)](#) and [Alston \(1879-1882\)](#). In addition, at that

time, the difference between author and editors was not always clear; even today, the authorship of parts or whole books are wrongly attributed to the editor.

According to our analysis, up to 1820 the common practice was to disseminate information mostly through books; afterwards, the communication through articles and magazines were the dominant communication practice, with a considerable increase in the number of journals from that date. This increase is closely related to the multiplication of researchers and the urgency to report their findings, but at the same time the advancement of science brought a greater specialization; consequently, the old journals of general coverage, were divided into different scientific fields and new journals were created, mostly specialized in particular disciplines ([Moskovkin and Serkina 2016](#)).

In the history of the Mexican mammalogy, the growth in the number of journals has been modest relative to the general trend, but the overall increase has been accentuated over the past 25 years (Figure 4), a period when 240 journals were created (33 % of the total). The specialized journals created after 1990 such as *Acta Chiropterologica*, *Zootaxa*, *Mastozoología Neotropical*, *Revista Mexicana de Mastozoología* and *Therya* are good examples of recent journals.

Some 21 % ( $n = 148$ ) journals have been published for a long time, and the majority are dissemination media of renown scientific societies, museums or universities that have been edited and distributed printed materials for more than 40 years. However, a few have remained without changes in name and subject, and most of them were forced to become modernized, adopting the new strategies of editorial standards; reception and arbitration of manuscripts; publication modalities, from printed to digital formats; frequency, with some increasing the issue of numbers per year; some changed the name to another more understandable, more general or in English, as the case of *Zeitschrift für Säugetierkunde* that changed to *Mammalian Biology*, *Great Basin Naturalist* to *Western North American Naturalist*, *The Annals and Magazine of Natural History* to the *Journal of Natural History*, *Systematic Zoology* who became *Systematic Biology*, or the *Revista de Biología Tropical* that was renamed as *International Journal of Tropical Biology and Conservation*, just to name a few; in addition, many were associated with commercial publishers (e. g. Elsevier, Springer).

However, the reality of many journals, both in Mexico and abroad, is complicated and not always continued, as some are short-living while others ultimately succumbed over time. More than 23 % ( $n = 165$ ) no longer publish on mammals of Mexico, and most are no longer printed. There are many examples of this type of journals; some worth mentioning for their high productivity are *University of Kansas Publications Museum of Natural History*, *Proceedings of the United States National Museum*, *Field Museum of Natural History Zoological Series*, *Archiv für Naturgeschichte* (1912-1923), *Isis von Oken* (1817-1848), *Abhandlungen der Königlich-Preussischen Akademie der Wissenschaften zu Ber-*



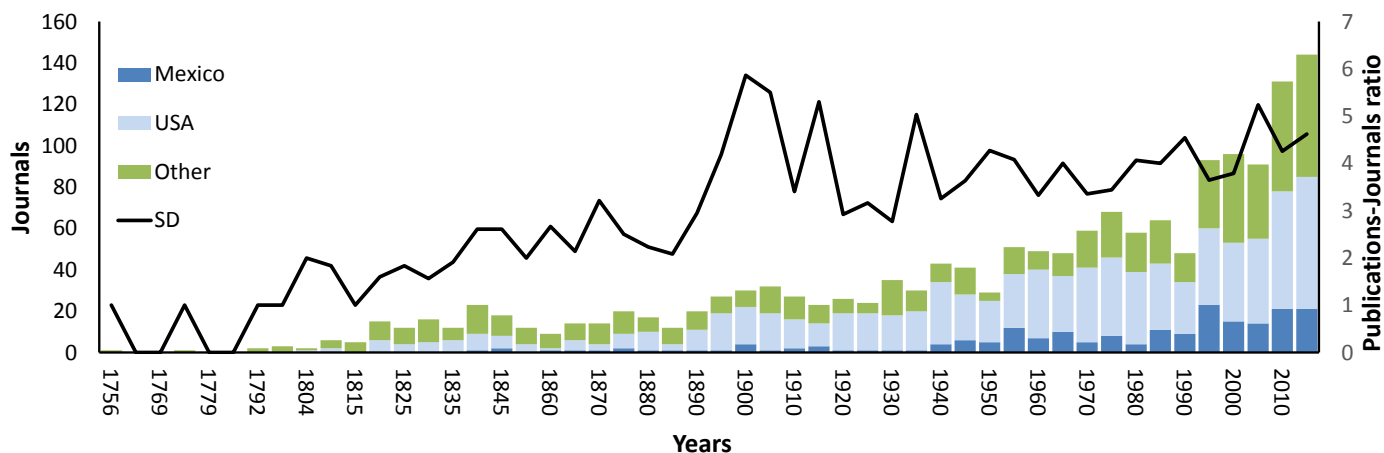


Figure 4. Increase in the number of journals and articles by journal published from 1756 to 2016. DE = Standard deviation.

lin (1804-1900), *Monatsberichte der Königlich Preussischen Akademie der Wissenschaften zu Berlin* (1856-1881).

In Mexico, several journals have become extinct, some of significant historical value for the number of works published: as *La Naturaleza* (1869-1912), *Anales del Museo Nacional de México* (1877-1908), *Memorias y Revista de la Sociedad Científica "Antonio Alzate"* (1890-1931) and the *Boletín de la Dirección de Estudios Biológicos* (1916-1931). [Guevara-Chumacero et al. \(2001\)](#) mention that 13 Mexican journals ceased publication in 1995; four others did so at a later date, such as the *Revista de la Sociedad Mexicana de Historia Natural* (1938-2005?), *Anales de la Escuela Nacional de Ciencias Biológicas* (1939-2000?), *Zoología Informa* (1987-2005?) and *Vertebrata Mexicana* (1996-2012?).

[Laborde \(2009\)](#) gives solid arguments for some of the reasons behind the extinction of journals; one of these -- and the most important one -- is the current lack of interest of national researchers to publish their results non-indexed journals that, according to common thinking, have with poor international visibility, particularly as regards taxonomic work. Another reason is the high cost of printing, even if editing involved a few copies and the distribution was undertaken through electronic means. In other cases, the disappearance is likely due to reasons that not exclusively economic, such as the disappearance of funding institution, the lack of attention and/or interest of the editor, because these have not been adapted to the new digital technologies, and for failure to meet the national or international index standards. Currently and in view of a global scientific communication system, journals have assumed an uncontrolled race in search of "quality", where the strong journals get even stronger and the weaker become even more vulnerable ([Moskovkin and Serkina 2016](#)). Under this principle, journal managers should develop a number of strategies to maintain the form and substance, obtain the necessary support to ensure rigorously the periodicity of publication, increase the number of articles, incorporate the citation index, improve design quality, have proofreading and secretarial support in place, but, above all, manage the impact factor and everything needed to ensure the continuity of the journal.

*Impact of Journals.* The Impact Factor (IF) by Thomson Reuters is one of the most widely applied bibliometric indicators in assessment processes both of scientific journals ([Michan and Llorente-Bousquets 2010](#)), as in the academic staff, institutions and disciplines, although the latter has led to severe criticism in various articles around the world (see [Laborde 2009](#)); Thomson Reuters, ISI's owner (for its acronym in English: Institute for Scientific Information) has proposed to use the IF with discretion ([Thomson Scientific 2015](#)); however, as this practice has permeated so deep in evaluation exercises in our field, it is likely to remain for a long time.

The Mexican mammalogy has obtained a high FI score in the past 25 years. This is explained because works are published not only in journals specialized in mammalogy or any of the various branches of zoology, but dissemination is also made in journals of related areas that have achieved a higher average FI, such as ecology (FI > 2.5) and conservation (FI > 1.8; Thomson Scientific 2015). Although the mean IF is high, most works (76.2 %) are published in journals with a low IF, below 0.590. It is well known that the basic research disciplines such as zoology generally have a low IF just for being basic, raising little general or global interest ([Krell 2000](#)). At the same time, the average citation life is short, the recovery and dynamics of citations are comparatively low relative to high-impact or applied disciplines such as oncology, immunology and molecular biology ([Laborde 2009](#)). This situation has led to proposals that raise the need to set different standards to assess basic research disciplines, such as the ones mentioned above, and for high-impact areas or specialized fields ([Krell 2000](#)).

In spite of the high productivity of mammalogy in Mexico, it is likely that the impact of the discipline and of national journals, measured with the Impact Factor, does not significantly increase in the coming years. We cannot ignore that journals that publish in Spanish are less favored in the number of citations relative to English-language journals; there is a marked preference to cite the works published in foreign journals of countries like the U.S. and Europe, in contrast to those published in Latin American countries. On the other hand, mammalogy as a discipline

of zoology has less impact than other areas such as ecology, conservation, and biogeography, among others, because most studies on mammals have a local or regional and importance, reaching global interest occasionally (Seglen 1997; Krell 2000; Shubert 2012), as well as a widespread trend in most national researchers to prefer to publish their best contributions in international journals (Laborde 2009). Unfortunately, none of these criteria addresses the scientific quality of the articles, journals or the discipline.

*Influence of scientific societies.* It has been mentioned that 61.5 % of the knowledge of Mexican mammals comes from 27 journals that stand out not only for the amount of works relating to mammalogy, but also because they are those with the greater permanence. These journals are published under the auspices of scientific societies, universities, museums of natural history, research centers and a minority are private. It is precisely scientific societies that have participated overwhelmingly in the knowledge of the Mexican mammalogy with over 60 % of all reviewed works (Figure 3).

The U.S. societies that have made the greatest contribution to the study of the mammals of Mexico are the *American Society of Mammalogists* founded in 1919, with a long tradition in Mexico (Birney and Choate 1994) through two journals (*Journal of Mammalogy* and *Mammalian Species*); the *Southwestern Association of Naturalists*, created in 1953 and its journal, *The Southwestern Naturalist*, published since 1956; and the *Biological Society of Washington* with a long history since 1880 and with prominent members such as C. Hart Merriam and Wilfred H. Osgood (Aldrich 1980), with its journal *Proceedings of the Biological Society of Washington* published since 1882.

In Mexico, societies have promoted the biological knowledge and gave a great impetus to the publication of works (Lorente-Bousquets et al. 2008). Specialized organizations include the *Asociación Mexicana de Mastozoología* (Mexican Association of Mammalogy) that, in addition to the organization of congresses and grant of awards to stimulate and promote the knowledge of the mammals of Mexico (Lorenzo and Hernandez-Betancourt 2014b; Sanchez Herrera 2014), has published three journals: *Zacatucho*, published for a few years (1987-1989); *Revista Mexicana de Mastozoología* (1995-2010) which was issued annually and convened a large number of researchers, institutions and subjects; the journal *Therya* was launched in 2010, being the youngest of all of the journals analyzed and has become the most productive of all in recent years (2010-2016), including foreign magazines, with 121 articles specifically focused of the mammals of Mexico, although its scope is broader the contribution of works conducted in Central and South America is considered.

The history of other journals has been strikingly different, for instance, the "Antonio Alzate" Scientific Society founded in 1884, which published the *Memorias y Revista de la Sociedad Científica "Antonio Alzate"* whose issue number 1 appeared in 1890 and the last issue was published in 1921. Only seven of all the works published in this journal

regarded mammals, but are worth mentioning for the personalities that authored them, including Alfredo Dugès and Alfonso L. Herrera.

The history of other societies is full of twists and turns, for instance the Mexican Society of Natural History and its journals *La Naturaleza* and *Revista de la Sociedad Mexicana de Historia Natural*, whose history has been widely documented (Beltrán 1948; Gio-Argáez and Rivas-Lechuga 1993; Saldaña and Azuela 1994, Rosas-Becerril 2012; Ramírez-Pulido and González-Ruiz 2006; Armendariz et al. in press), included detailed accounts of their history and contribution to science, published works, topics covered, as well as their evolution. The Society was created on 29 August 1868 and one of the first tasks to undertake was the creation of an information instrument through the journal *La Naturaleza*, which published 11 volumes including a total of 690 articles, 22 on mammals. Worth mentioning is the participation of Mexican naturalists like Alfredo Dugès, Alfonso Herrera and Manuel M. Villada, the painter José María Velasco who made remarkable contributions, as well as distinguished foreigners such as Joel A. Allen, Elliot Coues and Frederick Sumichrast. The *Revista de la Sociedad Mexicana de Historia Natural* was published uninterruptedly for 65 years; in spite of this, after 2005 its fate is uncertain, with various factors playing against, including fading interest and, perhaps most importantly, the lack of funding. The Society, characterized by maintaining the scientific tradition in Mexico, is one of the few such organizations that have managed to reach our days and be considered as one of the oldest in Latin America, even more than the Spanish Royal Society of Natural History, founded in 1871.

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**Appendix I.** Journal and serial publications that were published works related to the mammals of Mexico from 1683 to 2016. Articles per Journal (no.)

No.	Journal	No.I	No.	Journal	No.I
1	Abhandlungen der Bayerischen Akademie der Wissenschaften Mathematisch-naturwissenschaftliche Abteilung Neue Folge	1	53	Annals du Muséum National d'Histoire Naturelle	5
2	Abhandlungen der Königlichen Preussischen Akademie der Wissenschaften zu Berlin	11	54	Annals of Botany	1
3	Abhandlungen der Naturforschenden Gesellschaft zu Halle. II Sitzungsberichte	1	55	Annals of Carnegie Museum	13
4	Abhandlungen Herausgegeben von der Senckenbergischen Naturforschenden Gesellschaft Frankfurt	1	56	Annals of Natural History	2
5	Abhandlungen Mathematisch-Physikalische Königlichen Bayerischen Akademie der Wissenschaften München	4	57	Annals of the Entomological Society of America	6
6	Abstract of the Proceedings of the Linnean Society of New York City	1	58	Annals of the Lyceum of Natural History of New York	4
7	Abstracts of the Proceedings of the Zoological Society of London	1	59	Annesio Nobili	1
8	Acarologia	3	60	Annuaire du Musée Zoologique de l'Académie Impériale des Sciences de St.-Petersbourg	3
9	Accademia Nazionale dei Lincei (Roma) Quaderno N	1	61	Annual Review of Entomology	1
10	Acta Biológica Venezolana	2	62	Anzeiger der Kaiserlichen Akademie der Wissenschaften Mathematisch-Naturwissenschaftliche Classe	1
11	Acta Chiropterologica	33	63	Applied and Environmental Microbiology	1
12	Acta Theriologica	7	64	Archiv für Zoologi	1
13	Acta Universitaria Universidad de Guanajuato	2	65	Archiv für Mikroskopische Anatomie	2
14	Acta Zoologica Cracoviensis	1	66	Archiv für Naturgeschichte	20
15	Acta Zoologica Fennica	3	67	Archiv für Rasse Gessellschaft Biologisch	1
16	Acta Zoológica Mexicana	9	68	Archives des Sciences Physiques et Naturelles Genève	1
17	Acta Zoológica Mexicana, nueva serie	166	69	Archives of Natural History	1
18	Actes Société d'Histoire Naturelle Paris	1	70	Archivos de Medicina Veterinaria	1
19	Agrociencia	1	71	Archivos de Zootecnia	2
20	Agroforestry Systems	1	72	Archivos do Museu Nacional do Rio de Janeiro	1
21	Agroproductividad	16	73	Arkiv för Zoologi Stockholm	4
22	Ameghiniana	1	74	Arquivos de Zoologia Estado de São Paulo	2
23	American Journal of Botany	1	75	Arquivos do Museu Nacional Rio de Janeiro	2
24	American Journal of Physical Anthropology	1	76	Asociación Mexicana de Agrupaciones Espeleológicas, A. C. Mundos Subterráneos	1
25	American Journal of Primatology	20	77	Association Zoologique du Léman Bale & Genève Georg	1
26	American Journal of Public Health	1	78	Atlantic Journal	2
27	American Museum Novitates	83	79	Atlantic Journal and Friend of Knowledge	2
28	American Museum of Natural History	1	80	Atti della Società Toscana di Scienze Naturali Residente in Pisa Processi Verbali	1
29	American Society of Primatologist Bulletin	1	81	Australian Journal of Zoology Supplementary Series	1
30	Anales de la Escuela Nacional de Ciencias Biológicas	42	82	Basic and Applied Ecology	1
31	Anales de la Sociedad Española de Historia Natural	1	83	Bat Research News	13
32	Anales del Instituto de Biología, Universidad Nacional Autónoma de México	78	84	Bats	1
33	Anales del Instituto de Biología, Universidad Nacional Autónoma de México, Serie Biología Experimental	3	85	Baylor University Bulletin	1
34	Anales del Instituto de Biología, Universidad Nacional Autónoma de México, Serie Zoología	86	86	Beiträge zur Paläontologie von Österreich	1
35	Anales del Instituto de Ciencias del Mar y Limnología, Universidad Nacional Autónoma de México	1	87	Bericht über die zur Bekanntmachung geeigneten Verhandlungen der Königlich Preussischen Akademie der Wissenschaften zu Berlin	2
36	Anales del Museo Nacional de Historia Natural Buenos Aires	1	88	Bioagrocencias	2
37	Anales del Museo Nacional de Historia Natural Montevideo	1	89	Biochemical Systematics and Ecology	2
38	Anales del Museo Nacional de México	2	90	Biodiversitas	2
39	Anales del Museo Público de Buenos Aires	1	91	Biodiversity and Conservation	13
40	Anatomia Histologia Embryologia	2	92	Biodiversity Informatics	1
41	Anatomical Record	2	93	Biodiversity Letters	1
42	Animal and Veterinary Sciences	2	94	Bioespeleologia	1
43	Animal Biodiversity And Conservation	4	95	Biológica	1
44	Animal Biology	3	96	Biological Bulletin	2
45	Animal Conservation	6	97	Biological Conservation	18
46	Animal Production Science	1	98	Biological Invasions	1
47	Annalen der Wetterauischen Gesellschaft für die gesamte Naturkunde Frankfurt am Main	1	99	Biological Journal of the Linnean Society	9
48	Annales des Sciences Naturelles Zoologie	2	100	Biological Monographs University Illinois Press	1
49	Annales du Muséum d'Histoire Naturelle	6	101	Biological Reviews	1
50	Annales Historico-Naturales Musei Nationalis Hungarici	3	102	Biology Letters	1
51	Annali del Museo civico di storia naturale di Genova	4	103	Biology of Reproduction	1
52	Annals and Magazine of Natural History	131	104	BioScience	1
			105	BIOTAM	1
			106	Biótica	1
			107	Biotropica	22
			108	BMC Evolutionary Biology	3
			109	BMC Infectious Diseases	1
			110	Boletim do Museu Paraense Emílio Goeldi	4
			111	Boletim do Museu de Biologia Professor Mello Leitão Santa Teresa E. E. Santo Zoologia	1

112	Boletín de la Coordinación de Investigación Científica Universidad Michoacana San Nicolás de Hidalgo	1	169	Canadian Journal of Zoology	10
113	Boletín de la Dirección de Estudios Biológicos	3	170	Caribbean Journal of Science	1
114	Boletín de la Oficina Sanitaria Panamericana	2	171	Carnegie Institution of Washington Publication	3
115	Boletín de la Real Sociedad Española de Historia Natural	1	172	Caryologia	2
116	Boletín de la Sociedad de Ciencias Naturales	1	173	Centro de Investigaciones Ecológicas del Sureste Serie Monográfica	1
117	Boletín de la Sociedad Mexicana de Geografía y Estadística	1	174	Cespedesia	1
118	Boletín de la Sociedad Venezolana de Espeleología	1	175	Check List	6
119	Boletín del Instituto de Estudios Médicos y Biológicos	1	176	Chemoecology	1
120	Boletín del Instituto de Geología Universidad Nacional Autónoma de México	1	177	Chiroptera Neotropical	12
121	Boletín del Museo Nacional de Historia Natural de Chile	1	178	Chromosoma	4
122	Boletín Informativo del Centro de Investigaciones Biológicas Universidad Autónoma Nuevo León México	1	179	Chromosome Research	2
123	Boletín Informativo del Museo y Zona Arqueológica de Palenque (CONACULTA-INAH)	1	180	CIENCIA ergo sum	4
124	Boletín-Revista de la Universidad de Madrid	1	181	Ciencia México	19
125	Bollettino de la Società alla Geografica Italiana	1	182	Ciencia UANL	2
126	Bollettino dei Musei di Zoologia ed Anatomia comparata de la Università di Torino	2	183	Ciencia Universidad Autónoma de Nuevo León	2
127	Bonner Zoologische Beiträge	2	184	Ciencia y Desarrollo (CONACYT)	2
128	Bonner Zoologische Monographien	1	185	Ciencias	2
129	Boston Journal of Natural History	1	186	Ciencias Forestales y del Ambiente	1
130	Botanical Sciences	1	187	Cladistics	1
131	Brasil Florestal	1	188	Coleoptera Verlag der Nicolaischen Buchhandlung	1
132	Braunschweig [Brunswick Baja Sajonia Alemania] Karl Reichard: Magazin Insektenkunde	1	189	Comisión Impulsora y Coordinadora de la Investigación Científica	1
133	Brenesia	2	190	Community Ecology	1
134	Brigham Young University Science Bulletin Biological Series	1	191	Comparative Biochemistry and Physiology	3
135	Budapest Udvari Könyvnyomdaja	1	192	Comparative Parasitology	2
136	Bulleten-Moskovskogo Obshestva Ispitatelej Prirodi Novaja Serija	1	193	Comptes Rendus hebdomadaires des Séances de l'Académie des Sciences Paris	1
137	Bulletin de la Société des naturalistes de Moscou Section Biologique. n.s.	1	194	Comunicações do Museu de Ciências e Tecnologia da PUCRS Porto Alegre Série. Zoologia	1
138	Bulletin de la Société d'Études Scientifiques d'Angers	3	195	Comunicaciones del Museo Nacional de Buenos Aires	1
139	Bulletin de la Société Sciences Naturelles de l'Ouest de la France	1	196	Conservation and Genetics	1
140	Bulletin de la Société Zoologique de France	1	197	Conservation Biology	11
141	Bulletin des Sciences Naturelles et de Géologie	2	198	Conservation Genetics	4
142	Bulletin des Sciences par la Société Philomathique Paris	1	199	Conservation Genetics Resources	2
143	Bulletin du Musée d'Histoire Naturelle	3	200	Contributions from the Laboratory of Vertebrate Biology University of Michigan	1
144	Bulletin du Muséum National d'Histoire Naturelle	1	201	Contributions from the Laboratory of Vertebrate Genetics University of Michigan	1
145	Bulletin Institut Royal des Sciences Naturelles de Belgique Biologie	1	202	Contributions from the Museum of Paleontology University of Michigan	2
146	Bulletin of Carnegie Museum	2	203	Contributions in Science Los Angeles County Museum	7
147	Bulletin of Environmental Contamination and Toxicology	1	204	Contributions of the Royal Ontario Museum of Zoology and Palaeontology	1
148	Bulletin of the American Museum of Natural History	140	205	Courier Forschungsinstitut Senckenberg	1
149	Bulletin of the Association of Mexican Cave Studies	6	206	Cuadernos de Biodiversidad	1
150	Bulletin of the British Ornithologist's	1	207	Cuadernos de Investigación UNED	1
151	Bulletin of the Geological Society of America	1	208	Cuadernos de Trabajo Departamento del Instituto Nacional de Antropología e Historia	2
152	Bulletin of the Museum of Comparative Zoology	12	209	Cuadernos Mexicanos de Zoología	1
153	Bulletin of the Museum of Natural History University of Oregon	1	210	Cytogenetic and Genome Research	1
154	Bulletin of the New York State Museum	1	211	Cytogenetics	5
155	Bulletin of the Southern California Academy of Sciences	19	212	Cytogenetics and Cell Genetics	3
156	Bulletin of the U.S. Department of Agriculture	1	213	Cytologia	6
157	Bulletin of the U.S. Geological and Geographical Survey of the Territories	7	214	Deer Specialist Group News	5
158	Bulletin of the United States National Museum	7	215	Der Zoologische Garten	3
159	Bulletin of the Wisconsin Natural History Society (n. s.)	1	216	Desert Bighorn Council Transactions	1
160	Bulletins de l'Académie Royale des Sciences et Belles-Lettres de Bruxeles	1	217	Det Kongelige Danske Videnskabernes Selskabs Naturvidenskabelig og Mathematisk Afhandling	8
161	Byulleten' Moskovskogo Obshestva Ispytatelei Prirody Otdel Biologicheskii	1	218	Die Naturwissenschaften	1
162	Byulleten' Nauchno-issledovatel'skogo Instituta Zoologii Moskovskogo Universiteta	1	219	Dirección General de Agricultura Departamento de Exploración Biológica México Serie Zoológica	1
163	Calcutta Journal of Natural History and Miscellany of the Arts and Sciences in India	1	220	Dirección General Forestal y de Caza Departamento de Caza Boletín	1
164	Caldasia	3	221	Diversity and Distributions	3
165	California Fish and Game	2	222	Dōbutsugaku Zasshi	1
166	Canadian Journal of Botany	1	223	Doñana Acta Vertebrata	1
167	Canadian Journal of Genetics and Cytology	3	224	Ecofronteras	2
168	Canadian Journal of Research. Section D Zoological Sciences	1	225	Ecography	9
			226	Ecological Applications	3

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227	Ecology	2	287	Instituto de Antropología e Historia Colección Científica	1
228	Ecology and Evolution	1	288	Instituto de Biología, Universidad Nacional Autónoma de México, Cuadernos	3
229	Ecology Genetics and Physiology	1	289	Instituto de Biología, Universidad Nacional Autónoma de México, Publicaciones Especiales	2
230	Ecoscience	1	290	Instituto de Pesquisas Veterinarias Desiderio Finamor Porto Alegre	1
231	Edentata	1	291	Instituto Nacional de Antropología e Historia Departamento de Prehistoria Cuaderno de Trabajo	1
232	Emerging Infectious Diseases	1	292	Integrative Zoology	1
233	Endangered Species Research	1	293	Interciencia	2
234	Endangered Species Update	1	294	International Congress of Zoology Budapest	1
235	Entomological Magazine	1	295	International Journal for Parasitology	1
236	Entomological News	8	296	International Journal of Acarology	3
237	Environmental Conservation	1	297	International Journal of Primatology	8
238	Epidemiology and Infection	2	298	International Journal of Wilderness	1
239	Escuela Politécnica Nacional	1	299	International Journal of Zoological Research	1
240	Ethology	2	300	International Union for the Conservation of Nature	1
241	Ethology Ecology and Evolution	3	301	International Zoo Yearbook	1
242	Ethology International Journal of Behavioural Biology	1	302	Investigación Ambiental	1
243	Etnobiología	6	303	Investigación Ciencias y Artes en Chiapas	1
244	Evolution	14	304	Isis von Oken	6
245	Experientia	1	305	ITC Journal	1
246	Experimental and Applied Acarology	2	306	ITC Publications	1
247	Facultad de Biología Universidad Michoacana de San Nicolás de Hidalgo	1	307	IUCN/SSC Chiroptera Specialist Group	1
248	Facultad de Ciencias Biológicas Universidad Autónoma de Nuevo León Publicaciones Biológicas	1	308	IUCN/SSC Lagomorph Specialist Group	3
249	Facultad de Ciencias Universidad Nacional Autónoma de México Catálogo	1	309	IUCN/SSC Otter Specialist Group Bulletin	1
250	FEMS Immunology y Medical Microbiology	1	310	Izvestia Kavkazskago Muzeya	1
251	Field Columbian Museum Zoological Series	16	311	Japanese Journal of Veterinary Research	1
252	Field Museum of Natural History Zoological Series	17	312	Journal de la Société des Américanistes	2
253	Fieldiana: Zoology	16	313	Journal de Physique de Chimie d'Histoire naturelle et des Arts	2
254	Fieldiana: Zoology Memories	1	314	Journal for Nature Conservation	1
255	Fish and Wildlife Research Report	1	315	Journal of Animal and Veterinary Advances	2
256	Fish and Wildlife Service Special Scientific Report-Wildlife	1	316	Journal of Animal Ecology	1
257	Fitófilo	1	317	Journal of Applied Ecology	3
258	Florida Entomologist	1	318	Journal of Arachnology	2
259	Folia Entomológica Mexicana	9	319	Journal of Arctic Institutte of North Amererica	1
260	Forest and Stream	1	320	Journal of Arid Environments	12
261	Forest Ecology and Management	1	321	Journal of Arizona Academy of Sciences	2
262	Fossilium Catalogus	1	322	Journal of Biogeography	9
263	Frontiers in Microbiology	1	323	Journal of Comparative Physiology	1
264	Functional Ecology	1	324	Journal of Ecology	1
265	Gaumer on Cozumel and Ruatan Islands Gulf of Honduras.	1	325	Journal of Emerging Infectious Diseases	2
266	Gelehrte Anzeigen der Bayerische Akademie der Wissenschaften zu München	1	326	Journal of Entomological Science	1
267	Genetica	2	327	Journal of Environmental Science and Health Part A	1
268	Geofísica Internacional	1	328	Journal of Ethnobiology	2
269	Geological and Natural History Survey of Minnesota Bulletin	1	329	Journal of Ethnobiology and Ethnomedicine	4
270	Geological Magazine New Series	1	330	Journal of Evolutionary Biology	1
271	Geological Survey	2	331	Journal of Experimental Zoology Part A: Ecological Genetics and Physiology	1
272	Global Ecology and Biogeography	5	332	Journal of General Virology	1
273	Great Plains Research	1	333	Journal of Heredity	5
274	Habitat International	1	334	Journal of Kansas Entomological Society	1
275	Helminthologia	1	335	Journal of Mammalian Evolution	7
276	Hereditas	1	336	Journal of Mammalogy	644
277	Herpetological Review	1	337	Journal of Medical Entomology	19
278	Herreriana	1	338	Journal of Molecular Biology	1
279	Holmbergia	1	339	Journal of Molecular Ecology	1
280	Horae Societatis Entomologicae Rossicae variis sermonibus in Rossia usitatis editae	1	340	Journal of Morphology	2
281	Human Ecology	2	341	Journal of Natural History	4
282	Human-Wildlife Interactions	1	342	Journal of New York Entomological Society	1
283	IBDF Boletim Técnico	1	343	Journal of Parasitology	32
284	Iheringia Série Zoologia	2	344	Journal of Range Management	1
285	Illinois Biological Monographs	2	345	Journal of the Academy of Natural Sciences of Philadelphia	12
286	Infectologia	2	346	Journal of the Arizona-Nevada Academy of Science	2



347	Journal of the Barbados Museum and Historical Society	1	407	Middleburg PA: The "Middleburg Post" Press	1
348	Journal of the New York Entomological Society	1	408	Miscelánea Zoológica Academia de Ciencias de Cuba	1
349	Journal of the Otters Trust	1	409	Miscellaneous Publications Museum of Natural History University of Kansas	4
350	Journal of the Society for the Bibliography of Natural History	2	410	Miscellaneous Publications Museum of Zoology University of Michigan	15
351	Journal of the Trinidad Field Naturalists' Club	1	411	Mitochondrial DNA	1
352	Journal of the Washington Academy of Sciences	40	412	Mitteilungen aus dem Museum für Naturkunde in Berlin	2
353	Journal of Tropical Ecology	18	413	Molecular Biology and Evolution	1
354	Journal of Tropical Zoology	1	414	Molecular Ecology	12
355	Journal of Vector Ecology	1	415	Molecular Ecology Note	1
356	Journal of Vertebrate Paleontology	2	416	Molecular Ecology Resources	1
357	Journal of Virology	1	417	Molecular Phylogenetics and Evolution	33
358	Journal of Wildlife Diseases	8	418	Monatsberichte der Königlichen Preussischen Akademie der Wissenschaften zu Berlin	25
359	Journal of Wildlife Management	2	419	Monografía Instituto de Geofísica	1
360	Journal of Zoo and Wildlife Medicine	1	420	Monographs of the Western North American Naturalist	1
361	Journal of Zoological Systematics and Evolutionary Research [Zeitschrift für Zoologische Systematik und Evolutionsforschung]	2	421	Monthly Bulletin of the California State Commission on Horticulture	2
362	Journal of Zoology	12	422	Mundos Subterráneos	1
363	Journal of Ethnobiology	1	423	Museum der Senckenbergischen	1
364	Kjöbenhavn [Copenague]: E Museo Lundii	1	424	Myotis	1
365	Konglia Svanska Vetenskaps-Akademiens Handlingar	1	425	National Magazine	1
366	Kongliga Vetenskaps Akademien Handlingar Stockholm	2	426	National Museum of Canada Bulletin	1
367	Kunglia Svenska Vetenskapsakademiens Handlingar	1	427	Natural Areas Journal	4
368	La Natureza	19	428	Natural History Miscellanea The Chicago Academy of Sciences	3
369	L'Anthropologie (Paris)	1	429	Natural History Museum of Los Angeles County Science Bulletin	1
370	Le Naturaliste	2	430	Naturaleza y Desarrollo	3
371	Le Naturaliste Canadien	2	431	Neotrópica	2
372	L'Echo du Monde Savant	1	432	Neotropical Biology and Conservation	1
373	Life Sciences Contributions, Royal Ontario Museum	6	433	Neotropical Primates	15
374	Life Sciences Occasional Papers Royal Ontario Museum	1	434	Neuropsychologia	1
375	L'Institut Paris	1	435	New México Museum of Natural History and Science Bulletin	1
376	Louisiana State University Studies Biological Science Series	1	436	Ninth Annual Report of the United States Geological and Geographical Survey of the Territories for the year	1
377	Lutra	1	437	North American Fauna	51
378	Magasin de Zoologie d'Anatomie Comparée et de Palaeontologie	1	438	Notas del Museo de La Plata Zoología	1
379	Magasin de Zoologie Journal	1	439	Notas Mastozoológicas Sociedad Colombiana de Mastozoología	2
380	Magasin Encyclopédique: ou Journal des Sciences des Letters et des Arts	1	440	Notes from the Leiden Museum	5
381	Magazin Encyclopédique Paris	1	441	Notes from the Royal Zoological Museum of the Netherlands at Leiden	1
382	Magazin für Thiergeschichte Thieranatomie und Thierarzneykunde Göttingen: Johan Christian Dietrich	1	442	Notulae Naturae of the Academy of Natural Sciences of Philadelphia	1
383	Magazine of Zoology and Botany	1	443	Nouvelles Annales du Muséum National d'Histoire Naturelle Paris	1
384	Mammal Review	1	444	Nova acta physico-medica Academiae Caesareae Leopoldino-Carolinae Natarae Curiosorium	1
385	Mammalia	34	445	Novitates Zoologicae	4
386	Mammalian Biology	28	446	Nuovi Annali delle Scienze Naturali Bologna	1
387	Mammalian Chromosomes Newsletter	9	447	Nuovo Giornale de' Letterati Pisa	1
388	Mammalian Species	313	448	Occasional Papers The Museum of Texas Tech University	66
389	Mastozoología Neotropical	11	449	Occasional Papers Bell Museum of Natural History	1
390	Medical Repository	1	450	Occasional Papers in Zoology of Michael K. Petersen	3
391	Memoir of the National Academy of Sciences	1	451	Occasional Papers of the California Academy of Sciences	1
392	Mémoires Concernant l'Histoire Naturelle de l'Empire Chinois	2	452	Occasional Papers of The Museum of Natural History University of Kansas	13
393	Mémoires du Muséum d'Histoire Naturelle Paris	4	453	Occasional Papers of the Museum of Southwestern Biology University New Mexico	1
394	Mémoires du Muséum Nationale d'Histoire Naturelle Série C Scienes de la Terre	1	454	Occasional Papers of the Museum of Zoology Louisiana State University	7
395	Mémoires Présentés par Divers Savans a l'Académie Royales des Sciences de l'Institut de France	1	455	Occasional Papers of the Museum of Zoology University of Michigan	39
396	Mémoires de l'Académie Impériale des Sciences de Saint Pétersbourg	2	456	Occasional papers of the Western Foundation of Vertebrate Zoology	1
397	Mémoires du Academie Sciences de Saint Petersburg Sciences Naturelles	1	457	Occasional Papers Sam Noble Oklahoma Museum of Natural History	1
398	Mémoires du Societe d'Histoire Naturelle Strasbourg	1	458	Occasional Publication Series University of Kansas Center of Latin American Studies	1
399	Memoirs of the American Museum of Natural History	1	459	Oecologia	1
400	Memoirs of the Australian Museum	1	460	Office of Research Western New Mexico University	1
401	Memoirs of the Geological Survey of Kentucky	1	461	Öfversigt af Kongliga Vetenskaps-Akademiens Förhandlingar	1
402	Memoirs of the Southern California Academy of Sciences	1	462	Oikos	1
403	Memoirs of the Wernerian Natural History Society	2	463	Open Veterinary Journal	2
404	Memorias del Instituto Oswaldo Cruz Río de Janeiro	1	464	Open Zoology	1
405	Memorias y Revista de la Sociedad Científica "Antonio Alzate"	9			
406	Memorie della Società Italiana di Scienze Naturali	1			

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465	Oryx	8	523	Revista Brasileira de Zoologia	4
466	Pacific Insects	2	524	Revista Centro de Estudiantes de Agronomía y Veterinaria Universidad de Buenos Aires	1
467	Palaeogeography Palaeoclimatology Palaeoecology	1	525	Revista Chapingo Serie Ciencias Forestales y del Ambiente	1
468	Papéis Avulsos do Departamento de Zoologia São Paulo	1	526	Revista Chapingo Serie Horticultura	1
469	Papers of Michigan Academy of Science Arts and Letters	1	527	Revista Chilena de Historia Natural	3
470	Parasite	1	528	Revista Científica FCV-LUZ	1
471	Parasitology International	2	529	Revista Colombiana de Ciencias Animales	1
472	Parasitology Research	2	530	Revista de Biología Tropical	29
473	Per le stampe di Annesio Nobili	2	531	Revista de Investigaciones en ZONOSIS Pública	1
474	Periodicum Biologorum	1	532	Revista de la Academia colombiana de Ciencias Exactas Físicas y Naturales	4
475	Philosophical Magazine New Series	1	533	Revista de la Coordinación Nacional de Arqueología INAH segunda época	1
476	Philosophical Transactions	1	534	Revista de la Sociedad Científica del Paraguay	2
477	Physiology and Behavior	1	535	Revista de la Sociedad Mexicana de Entomología	1
478	Physis	2	536	Revista de la Sociedad Mexicana de Historia Natural	46
479	PLOS Neglected Tropical Diseases	3	537	Revista de la Sociedad Mexicana de Paleontología	1
480	PlosOne	11	538	Revista de la Universidad de Buenos Aires Série	1
481	Poeyana	1	539	Revista de Zoología	1
482	Primate Conservation	2	540	Revista del Instituto de Salubridad y Enfermedades Tropicales	5
483	Primates	7	541	Revista del Museo Argentino de Ciencias Naturales "Bernardino Rivadavia" e Instituto Nacional de Investigación de Ciencias Naturales	1
484	Proceedings of California Academy of Sciences	1	542	Revista Digital Universitaria UNAM	2
485	Proceedings of the Academy of Natural Sciences of Philadelphia	71	543	Revista do Instituto de Medicina Tropical de São Paulo	1
486	Proceedings of the American Philosophical Society	5	544	Revista do Museu Paulista	4
487	Proceedings of the Arkansas Academy of Sciences	1	545	Revista Latinoamericana de Conservación	1
488	Proceedings of the Asiatic Society of Bengal	1	546	Revista Latinoamericana de Microbiología	4
489	Proceedings of the Biological Society of Washington	392	547	Revista Mexicana de Biodiversidad	101
490	Proceedings of the Boston Society of Natural History	8	548	Revista Mexicana de Mastozoología	119
491	Proceedings of the California Academy of Sciences	15	549	Revista Mexicana de Micología	1
492	Proceedings of the Colorado Museum of Natural History	5	550	Revue et Magasin de Zoologie pure et appliquée	7
493	Proceedings of the Entomological Society of Ontario	1	551	Revue Française de Mammologie	1
494	Proceedings of the Entomological Society of Washington	2	552	Revue Suisse de Zoologie	4
495	Proceedings of the Geologists' Association	1	553	Revue Zoologique	1
496	Proceedings of the Helminthological Society of Washington	1	554	Royal Ontario Museum Life Sciences Contributions	1
497	Proceedings of the National Academy of Sciences of the United States of America	4	555	Säugethiere	1
498	Proceedings of the New England Zoological Club	16	556	Säugetierkundliche Mitteilungen	2
499	Proceedings of the Portland Society of Natural History	1	557	Schriften des Naturwissenschaftlichen Vereins des Harzes in Wernigerode	1
500	Proceedings of the United States National Museum	52	558	Science	21
501	Proceedings of the Washington Academy of Sciences	6	559	Science Bulletin of the Museum of Brooklyn Institute of Arts and Sciences	1
502	Proceedings of the Western Foundation of Vertebrate Zoology	1	560	Scientific Publications of the Cleveland Museum of Natural History	4
503	Proceedings of the Zoological Society of London	101	561	Scripta Geologica	1
504	Publicaciones Biológicas Facultad de Ciencias Biológicas Universidad Autónoma Nuevo León	4	562	Secretaría de Agricultura y Ganadería Departamento de Caza México Boletín de Divulgación	1
505	Publicaciones del Departamento de Prehistoria Instituto Nacional de Antropología e Historia	1	563	Seed Science Research	1
506	Publicaciones del Instituto Nacional de Antropología e Historia	1	564	Senckenbergiana Biologica	2
507	Publicaciones del Museo de Historia Natural "Javier Prado " Serie A Zoología	2	565	Sitzungsberichte der Gesellschaft Naturforschender Freunde zu Berlin	4
508	Publicaciones del Museo de Historia Natural Universidad Nacional Mayor de San Marcos Série A Zoología	1	566	Sitzungsberichte der Kaiserlichen der Wissenschaften Wien Mathematisch-Naturwissenschaftlichen Classe	9
509	Publicaciones Especiales del Instituto de Historia Natural	1	567	Sitzungsberichte der Mathematisch-Naturwissenschaftliche Classe der Kaiserlichen Akademie der Wissenschaften zu Wien	1
510	Publications of the Museum Michigan State University Biological Series	5	568	Skrifter af Naturhistorie-Selskabet Kjobenhavn	1
511	Quaternary International	1	569	Small Carnivore Conservation	1
512	Quaternary Research	1	570	Smithsonian Contributions to Zoology	6
513	Quehacer Científico en Chiapas	1	571	Smithsonian Institution Bulletin of the United States National Museum	1
514	Rangeland Ecology and Management	1	572	Smithsonian Miscellaneous Collections	13
515	Regional Environmental Change	1	573	Sociedad de Fomento de la Comisión de Parasitología Agrícola	1
516	Regional Studies and Reproduction	1	574	Sociedad Medica de San Luis Potosí	1
517	Report of the United States Geological Survey of the Territories Government Printing Office Washington	1	575	Southwestern Entomologist	4
518	Reprinted from the ninth Annual Report of the New York Zoological Society	1	576	Special Publication of the Museum of Natural History The University of Kansas	1
519	Revista Argentina de Historia Natural	1	577	Special Publications Museum of Texas Tech University	16
520	Revista Bio Ciencias	1	578	St. Petersburg: Zoosystematica Rossica	1
521	Revista Brasileira de Biología	3	579	Studies in Avian Biology	1
522	Revista Brasileira de Genética	1			

580	Studies on Neotropical Fauna and Environment	7	640	Transactions of Wisconsin Academy of Sciences Art and Letters	1
581	Studies on the Fauna of Curaçao and other Caribbean Islands	1	641	Transboundary and Emerging Diseases	1
582	Suiform Soundings IUCN/SSC Specialist Groups	1	642	Tropical and Subtropical Agroecosystems	1
583	Suplemento Especial de la Revista de la Academia Colombiana de Ciencias Exactas Físicas y Naturales	1	643	Tropical Conservation Science	23
584	Systematic Parasitology	2	644	Tropical Medicine	1
585	Systematic Biology	4	645	Trudy Zoologicheskogo Instituta, Akademiya Nauk SSSR	1
586	Systematic Zoology	18	646	United States Department of Agriculture Department Bulletin	1
587	Tapir Conservation	2	647	United States Department of Agriculture Technical Bulletin	1
588	Técnica Pecuaria en México	1	648	Universidad Autónoma Chapingo Dirección de Difusión Cultural Departamento de Bosques Colección Cuadernos Universitarios	1
589	Texas Agricultural Experiment Station Bulletin	1	649	Universidad Ciencia y Tecnología	2
590	Texas Memorial Museum The Pearse-Sellards Series	1	650	Universidad de Guanajuato Dirección de Investigación y Posgrado Acta Universitaria	1
591	Texas Memorial Museum University of Texas Bulletin	1	651	Universidad y Ciencia (UJAT México)	2
592	The American Journal of Science and Arts	5	652	Universidad y Ciencia Trópico Húmedo	1
593	The American Journal of Tropical Medicine and Hygiene	2	653	Università di Torino	2
594	The American Midland Naturalist	25	654	University New Mexico Bulletin Geological Series	1
595	The American Monthly Magazine and Critical Review	3	655	University New Mexico Publications in Biology	1
596	The American Natural History	1	656	University of California Publications in Entomology	2
597	The American Naturalist	26	657	University of California Publications in Zoology	47
598	The Annals of Philosophy New Series	2	658	University of California Publications of the Department of Geological Sciences Bulletin	1
599	The Auk	3	659	University of Kansas Museum of Natural History Monograph	1
600	The Bailey Museum and Library of Natural History	3	660	University of Kansas Publications Museum of Natural History	76
601	The Bulletin of Zoological Nomenclature	11	661	University of Michigan Studies Scientific Series	1
602	The Canadian Field-Naturalist	5	662	University The Texas Agricultural Experiment Station Technical Monograph	1
603	The Coleopterists Bulletin	1	663	Ursus	1
604	The Great Basin Naturalist	2	664	USDA Forest Service Proceedings	1
605	The International Journal of Plant Animal and Environmental Sciences	1	665	Vector-Borne and Zoonotic Diseases	2
606	The Journal of the Asiatic Society of Bengal	8	666	Vegetatio	1
607	The Journal of the Elisha Mitchell Scientific Society	1	667	Verhandlungen der Kaiserlich-Königlichen Zoologisch-Botanischen Gesellschaft in Wien	1
608	The London Medical Repository Monthly Journal and Review	1	668	Vertebrata Hungarica	1
609	The Magazine of Natural History	3	669	Vertebrata Mexicana	34
610	The Medical Repository and Review of American Publications on Medicine Surgery and the Auxiliary Branches of Science New York Second Hexade	1	670	Veterinaria México	3
611	The Monthly American Journal of Geology and Natural History	1	671	Vida Silvestre Neotropical	2
612	The Murrelet	1	672	Videnskabelige Meddelelser fra den Naturhistoriske Forening i Kjöbenhavn	2
613	The Nation	1	673	Virology	1
614	The Pan-Pacific Entomologist	2	674	Virus Research	4
615	The Philadelphia Medical and Physical Journal	1	675	Walla Walla College Publications Department of Biological Sciences and Biology Station	1
616	The Publications of the Champlain Society	1	676	Wasmann Journal of Biology	1
617	The Quarterly Journal of Science Literature and Arts	2	677	Western New Mexico University Research in Science	1
618	The Quarterly Journal of the Geological Society of London	2	678	Western North American Naturalist	29
619	The Radford Review	1	679	Wetlands	1
620	The Rice Institute Pamphlet Monograph in Biology	1	680	Wildlife Biology	3
621	The Southwestern Naturalist	247	681	Wildlife Society Bulletin	8
622	The Texas Journal of Science	18	682	Zeitschrift der Deutschen Geologischen Gesellschaft	1
623	The University of Kansas Science Bulletin	2	683	Zeitschrift für Säugetierkunde	9
624	The University Studies of the University of Nebraska	2	684	Zeitschrift für Zoologische Systematik und Evolutionsforschung	2
625	The Zoological Journal	8	685	Zeitung für Zoologie Zootomie und Palaeontologie	1
626	Therya	121	686	Zoe A Biological Journal	1
627	Tijdschrift voor Natuurlijke Geschiedenis en Physiologie	1	687	Zoo Biology	1
628	Timehri n. s.	1	688	ZooKeys	3
629	Trabajos del Museo Nacional de Ciencias Naturales Serie Zoología Madrid	1	689	Zoologia (Curitiva)	1
630	Trace	1	690	Zoologia Informa	2
631	Transactions of Illinois State Academy of Sciences	3	691	Zoological Journal of the Linnean Society	8
632	Transactions of the American Philosophical Society	2	692	Zoological Miscellany	1
633	Transactions of the Entomological Society of London	1	693	Zoological Studies	1
634	Transactions of the Illinois State Academy of Science	1	694	Zoologicheskii Zhurnal	2
635	Transactions of the Kansas Academy of Science	19	695	Zoologie et Biologie Animale	3
636	Transactions of the Linnean Society of London	2	696	Zoologische Jahrbücher. Abteilung für Systematik Ökologie und Geographie der Tiere	2
637	Transactions of the Linnean Society of New York	1			
638	Transactions of the Royal Society of Tropical Medicine and Hygiene	1			
639	Transactions of the San Diego Society of Natural History	43			

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697	Zoologische Monographiën van het Rijksmuseum van Natuurlijke Historie	2
698	Zoologischer Anzeiger	9
699	Zoologischer Beobachter	1
700	Zoonoses Research	1
701	Zootaxa	16
702	Zootecnia Tropical	1
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	Total	5467
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